ENERGY AND ENVIRONMENT CABINET

Department for Environmental Protection

Division of Water

(Amendment)

401 KAR 10:031. Surface water standards.

RELATES TO: KRS 146.200-146.360, 146.410-146.535, 146.550-146.570, 146.600-146.619, 146.990, 224.01-010, 224.01-400, 224.16-050, 224.16-070, 224.70-100-224.70-140, 224.71-100-224.71-145, 224.73-100-224.73-120,[~~EO 2008-507, 2008-531~~]

STATUTORY AUTHORITY: KRS 146.220, 146.241, 146.270, 146.410, 146.450, 146.460, 146.465, 224.10-100, 224.16-050, 224.16-060, 224.70-100, 224.70-110, 40 C.F.R. Part 131, 16 U.S.C. 1271-1287, 1531-1544, 33 U.S.C. 1311, 1313, 1314, 1341

NECESSITY, FUNCTION, AND CONFORMITY: KRS 224.10-100 requires the cabinet to develop and conduct a comprehensive program for the management of water resources and to provide for the prevention, abatement, and control of water pollution.[~~EO 2008-507 and 2008-531, effective June 16, 2008, abolish the Environmental and Public Protection Cabinet and establish the new Energy and Environment Cabinet.~~] This administrative regulation and 401 KAR 10:001, 10:026, 10:029, and 10:030 establish procedures to protect the surface waters of the commonwealth, and thus protect water resources. This administrative regulation establishes water quality standards that consist of designated legitimate uses of the surface waters of the commonwealth and the associated water quality criteria necessary to protect those uses. These water quality standards are minimum requirements that apply to all surface waters in the

commonwealth of Kentucky in order to maintain and protect them for designated uses. These water quality standards are subject to periodic review and revision in accordance with the Clean Water Act, 33 U.S.C. 1251-1387, 40 C.F.R. 131, and KRS Chapter 224.

Section 1. Nutrients Criterion.[~~Nutrient.~~] Nutrients shall not be elevated in a surface water to a level that results in eutrophication.[~~Limits. In lakes and reservoirs and their tributaries, and other surface waters where eutrophication problems may exist, nitrogen, phosphorus, carbon, and contributing trace element discharges shall be limited in accordance with:~~

~~(1) The scope of the problem;~~

~~(2) The geography of the affected area; and~~

~~(3) Relative contributions from existing and proposed sources.~~]

Section 2. Minimum Criteria Applicable to All Surface Waters.

(1) The following minimum water quality criteria shall be applicable to all surface waters including mixing zones, with the exception that toxicity to aquatic life in mixing zones shall be subject to the provisions of 401 KAR 10:029, Section 4. Surface waters shall not be aesthetically or otherwise degraded by substances that:

(a) Settle to form objectionable deposits;

(b) Float as debris, scum, oil, or other matter to form a nuisance;

(c) Produce objectionable color, odor, taste, or turbidity;

(d) Injure, are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, fish, and other aquatic life;

(e) Produce undesirable aquatic life or result in the dominance of nuisance species;

(f)1. Cause fish flesh tainting.

2. The concentration of phenol shall not exceed 300 μg/L as an instream value.

(2) The water quality criteria for the protection of human health related to fish consumption in Table 1 of Section 6 of this administrative regulation are applicable to all surface water at the edge of the assigned mixing zones except for those points where water is withdrawn for domestic water supply use.

(a) The criteria are established to protect human health from the consumption of fish tissue, and shall not be exceeded.

(b) For those substances associated with a cancer risk, an acceptable risk level of not more than one (1) additional cancer case in a population of 1,000,000 people, or $1 \times 10^{-6}$ shall be utilized to establish the allowable concentration.

Section 3. Use Designations and Associated Criteria.

(1) Surface waters may be designated as having one (1) or more legitimate uses and associated criteria protective of those uses. Those uses are listed in 401 KAR 10:026. Nothing in this administrative regulation shall be construed to prohibit or impair the legitimate beneficial uses of these waters. The criteria in Sections 2, 4, 6, and 7 of this administrative regulation represent minimum conditions necessary to:

(a) Protect surface waters for the indicated use; and

(b) Protect human health from fish consumption.

(2) On occasion, surface water quality may be outside of the limits established to protect designated uses because of natural conditions. If this occurs during periods when stream flows are below the flow that is used by the cabinet to establish effluent limitations for wastewater treatment facilities, a discharger shall not be considered a contributor to instream violations of water quality standards, if treatment results in compliance with permit requirements.

(3) Stream flows for water quality-based permits. The following stream flows shall be

utilized if deriving KPDES permit limitations to protect surface waters for the listed uses and purposes:

(a) Aquatic life protection shall be $7Q_{10}$;

(b) Water-based recreation protection shall be $7Q_{10}$;

(c) Domestic water supply protection shall be determined at points of withdrawal as:

1. The harmonic mean for cancer-linked substances; and

2. $7Q_{10}$ for noncancer-linked substances;

(d) Human health protection from fish consumption and for changes in radionuclides shall be the harmonic mean; and

(e) Protection of aesthetics shall be $7Q_{10}$.

Section 4. Aquatic Life.

(1) Warm water aquatic habitat. The following parameters and associated criteria shall apply for the protection of productive warm water aquatic communities, fowl, animal wildlife, arboreous growth, agricultural, and industrial uses:

(a) Natural alkalinity as $CaCO_3$ shall not be reduced by more than twenty-five (25) percent.

1. If natural alkalinity is below twenty (20) mg/L $CaCO_3$, there shall not be a reduction below the natural level.

2. Alkalinity shall not be reduced or increased to a degree that may adversely affect the aquatic community;

(b) pH shall not be less than six and zero-tenths (6.0) nor more than nine and zero-tenths (9.0) and shall not fluctuate more than one and zero-tenths (1.0) pH unit over a period of twenty-four (24) hours;

(c) Flow shall not be altered to a degree that will adversely affect the aquatic community;

(d) Temperature shall not exceed thirty-one and seven-tenths (31.7) degrees Celsius (eighty-nine (89) degrees Fahrenheit).

1. The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

2. The cabinet may determine allowable surface water temperatures on a site-specific basis utilizing available data that shall be based on the effects of temperature on the aquatic biota that utilize specific surface waters of the commonwealth and that may be affected by person-induced temperature changes.

a. Effects on downstream uses shall also be considered in determining site-specific temperatures.

b. Values in the following table are guidelines for surface water temperature.

| Month/Date | Period Average | | Instantaneous Maximum | |
|---|---|---|---|---|
| | (°F) | (°C) | (°F) | (°C) |
| January 1-31 | 45 | 7 | 50 | 10 |
| February 1-29 | 45 | 7 | 50 | 10 |
| March 1-15 | 51 | 11 | 56 | 13 |
| March 16-31 | 54 | 12 | 59 | 15 |
| April 1-15 | 58 | 14 | 64 | 18 |
| April 16-30 | 64 | 18 | 69 | 21 |
| May 1-15 | 68 | 20 | 73 | 23 |
| May 16-31 | 75 | 24 | 80 | 27 |
| June 1-15 | 80 | 27 | 85 | 29 |

| | | | | |
|---|---|---|---|---|
| June 16-30 | 83 | 28 | 87 | 31 |
| July 1-31 | 84 | 29 | 89 | 32 |
| August 1-31 | 84 | 29 | 89 | 32 |
| September 1-15 | 84 | 29 | 87 | 31 |
| September 16-30 | 82 | 28 | 86 | 30 |
| October 1-15 | 77 | 25 | 82 | 28 |
| October 16-31 | 72 | 22 | 77 | 25 |
| November 1-30 | 67 | 19 | 72 | 22 |
| December 1-31 | 52 | 11 | 57 | 14 |

3. A successful demonstration concerning thermal discharge limits carried out pursuant to[~~under~~] Section 316(a) of the Clean Water Act, 33 U.S.C. 1326, shall constitute compliance with the temperature requirements of this subsection. A successful demonstration assures the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in or on the water into which the discharge is made;

(e) Dissolved oxygen.

1. a. Dissolved oxygen shall be maintained at a minimum concentration of five and zero-tenths (5.0) mg/L as a twenty-four (24) hour average in water with WAH use;

b. The instantaneous minimum shall not be less than four and zero-tenths (4.0) mg/L in water with WAH use.

2. The dissolved oxygen concentration shall be measured at middepth in waters having a total depth of ten (10) feet or less and at representative depths in other waters;

(f) Total dissolved solids or specific conductance. Total dissolved solids or specific conductance shall not be changed to the extent that the indigenous aquatic community is

adversely affected;

(g) Total suspended solids. Total suspended solids shall not be changed to the extent that the indigenous aquatic community is adversely affected;

(h) Settleable solids. The addition of settleable solids that may alter the stream bottom so as to adversely affect productive aquatic communities shall be prohibited;

(i) Ammonia. The concentration of the un-ionized form shall not be greater than 0.05 mg/L at any time instream after mixing. Un-ionized ammonia shall be determined from values for total ammonia-N, in mg/L, pH and temperature, by means of the following equation:

$$Y = 1.2 \text{ (Total ammonia-N)}/(1 + 10^{pKa-pH})$$

$$pk_a = 0.0902 + (2730/(273.2 + T_c))$$

Where:

$T_c$ = temperature, degrees Celsius.

Y = un-ionized ammonia (mg/L);

(j) Toxics.

1. The allowable instream concentration of toxic substances, or whole effluents containing toxic substances, which are noncumulative or nonpersistent with a half-life of less than ninety-six (96) hours, shall not exceed:

a. One-tenth (0.1) of the ninety-six (96) hour median lethal concentration ($LC_{50}$) of representative indigenous or indicator aquatic organisms; or

b. A chronic toxicity unit of 1.00 utilizing the twenty-five (25) percent inhibition concentration, or $LC_{25}$.

2. The allowable instream concentration of toxic substances, or whole effluents containing toxic substances, which are bioaccumulative or persistent, including pesticides, if not specified

elsewhere in this section, shall not exceed:

a. 0.01 of the ninety-six (96) hour median lethal concentration ($LC_{50}$) of representative indigenous or indicator aquatic organisms; or

b. A chronic toxicity unit of 1.00 utilizing the $IC_{25}$.

3. In the absence of acute criteria for pollutants listed in Table 1 of Section 6 of this administrative regulation, for other substances known to be toxic but not listed in this administrative regulation, or for whole effluents that are acutely toxic, the allowable instream concentration shall not exceed the $LC_1$ or one-third (1/3) $LC_{50}$ concentration derived from toxicity tests on representative indigenous or indicator aquatic organisms or exceed three-tenths (0.3) acute toxicity units.

4. If specific application factors have been determined for a toxic substance or whole effluent such as an acute to chronic ratio or water effect ratio, they may be used instead of the one-tenth (0.1) and 0.01 factors listed in this subsection upon demonstration by the applicant that the application factors are scientifically defensible.

5. Allowable instream concentrations for specific pollutants for the protection of warm water aquatic habitat are listed in Table 1 of Section 6 of this administrative regulation. These concentrations are based on protecting aquatic life from acute and chronic toxicity and shall not be exceeded; and

(k) Total residual chlorine. Instream concentrations for total residual chlorine shall not exceed an acute criteria value of nineteen (19) μg/L or a chronic criteria value of eleven (11) μg/L.

(2) Cold water aquatic habitat. The following parameters and criteria are for the protection of productive cold water aquatic communities and streams that support trout populations, whether

self-sustaining or reproducing, on a year-round basis. The criteria adopted for the protection of warm water aquatic life also apply to the protection of cold water habitats with the following additions:

(a) Dissolved oxygen.

1. A minimum concentration of six and zero-tenths (6.0) mg/L as a twenty-four (24) hour average and five and zero-tenths (5.0) mg/L as an instantaneous minimum shall be maintained.

2. In lakes and reservoirs that support trout, the concentration of dissolved oxygen in waters below the epilimnion shall be kept consistent with natural water quality; and

(b) Temperature. Water temperature shall not be increased through human activities above the natural seasonal temperatures.

Section 5. Domestic Water Supply Use. Maximum allowable in-stream concentrations for specific substances, to be applicable at the point of withdrawal, as established in 401 KAR 10:026, Section 5(2)(b), Table B, for use for domestic water supply from surface water sources are specified in Table 1 of Section 6 of this administrative regulation and shall not be exceeded.

Section 6. Pollutants. (1) Allowable instream concentrations of pollutants are listed in Table 1 of this section.

Table 1

| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
|---|---|---|---|---|---|
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Acenaphthene | 83329 | 670 | 990 | - | - |
| Acrolein | 107028 | 190 | 6 [~~290~~] | 3 [-] | 3 [-] |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Acrylonitrile | 107131 | 0.051 | 0.25 | - | - |
| Aldrin | 309002 | 0.000049 | 0.000050 | 3.0 | - |
| alpha-BHC | 319846 | 0.0026 | 0.0049 | - | - |
| alpha-Endosulfan | 959988 | 62 | 89 | 0.22 | 0.056 |
| Anthracene | 120127 | 8,300 | 40,000 | - | - |
| Antimony | 7440360 | 5.6 | 640 | - | - |
| Arsenic | 7440382 | 10.0 | - | 340 | 150 |
| Asbestos | 1332214 | 7 million fibers/L | - | - | - |
| Barium | 7440393 | 1,000 | - | - | - |
| Benzene | 71432 | 2.2 | 51 | - | - |
| Benzidine | 92875 | 0.000086 | 0.00020 | - | - |
| Benzo(a)anthracene | 56553 | 0.0038 | 0.018 | - | - |
| Benzo(a)pyrene | 50328 | 0.0038 | 0.018 | - | - |
| Benzo(b)fluoranthene | 205992 | 0.0038 | 0.018 | - | - |
| Benzo(k)fluoranthene | 207089 | 0.0038 | 0.018 | - | - |
| Beryllium | 7440417 | 4 | - | - | - |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Beta-BHC | 319857 | 0.0091 | 0.017 | - | - |
| Beta-Endosulfan | 33213659 | 62 | 89 | 0.22 | 0.056 |
| bis(chloromethyl)ether | 542881 | 0.00010 | 0.00029 | - | - |
| bis(2-chloroethyl)ether | 111444 | 0.030 | 0.53 | - | - |
| bis(2-chloroisopropyl)ether | 108601 | 1,400 | 65,000 | - | - |
| bis(2-ethylhexyl)phthalate | 117817 | 1.2 | 2.2 | - | - |
| Bromoform | 75252 | 4.3 | 140 | - | - |
| Butylbenzyl phthalate | 85687 | 1,500 | 1,900 | - | - |
| Cadmium | 7440439 | 5 | - | e(1.0166 (ln Hard*)-3.924) | e(0.7409 (ln Hard*)-4.719) |
| Carbon tetrachloride | 56235 | 0.23 | 1.6 | - | - |
| Chlordane | 57749 | 0.00080 | 0.00081 | 2.4 | 0.0043 |
| Chloride | 16887006 | 250,000 | - | 1,200,000 | 600,000 |
| Chlorobenzene | 108907 | 130 | 1600 | - | - |
| Chlorodibromomethane | 124481 | 0.40 | 13 | - | - |
| Chloroform | 67663 | 5.7 | 470 | - | - |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Chloropyrifos | 2921882 | - | - | 0.083 | 0.041 |
| Chromium | N/A | 100 | - | - | - |
| Chromium (III) | 16065831 | - | - | e(0.8190 (ln Hard*)+ 3.7256) | e(0.8190 (ln Hard*)+ 0.6848) |
| Chromium (VI) | 18540299 | - | - | 16 | 11 |
| Chrysene | 218019 | 0.0038 | 0.018 | - | - |
| Color | N/A | 75 Platinum Cobalt Units | - | - | - |
| Copper | 7440508 | 1,300 | - | e(0.9422 (ln Hard*)- 1.700) | e(0.8545 (ln Hard*)- 1.702) |
| Cyanide, Free | 57125 | 140 | 140 | 22 | 5.2 |
| Demeton | 8065483 | - | - | - | 0.1 |
| Diazinon | 333415 | | | 0.17 | 0.17 |
| Dibenzo(a,h)anthracene | 53703 | 0.0038 | 0.018 | - | - |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Dichlorobromomethane | 75274 | 0.55 | 17 | - | - |
| Dieldrin | 60571 | 0.000052 | 0.000054 | 0.24 | 0.056 |
| Diethyl phthalate | 84662 | 17,000 | 44,000 | - | - |
| Dimethyl phthalate | 131113 | 270,000 | 1,100,000 | - | - |
| Di-n-butyl phthalate | 84742 | 2,000 | 4,500 | - | - |
| Dinitrophenols | 25550587 | 69 | 5300 | - | - |
| Endosulfan sulfate | 1031078 | 62 | 89 | - | - |
| Endrin | 72208 | 0.059 | 0.060 | 0.086 | 0.036 |
| Endrin aldehyde | 7421934 | 0.29 | 0.30 | - | - |
| Ethylbenzene | 100414 | 530 | 2100 | - | - |
| Fluoranthene | 206440 | 130 | 140 | - | - |
| Fluorene | 86737 | 1,100 | 5,300 | - | - |
| Fluoride | N/A | 4,000 | - | - | - |
| | | | | | |
| Guthion | 86500 | - | - | - | 0.01 |
| Heptachlor | 76448 | 0.000079 | 0.000079 | 0.52 | 0.0038 |
| Heptachlor epoxide | 1024573 | 0.000039 | 0.000039 | 0.52 | 0.0038 |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Hexachlorobenzene | 118741 | 0.00028 | 0.00029 | - | - |
| Hexachlorobutadiene | 87683 | 0.44 | 18 | - | - |
| Hexachlorocyclo-hexane-Technical | 319868 | 0.0123 | 0.0414 | - | - |
| Hexachlorocyclopentadiene | 77474 | 40 | 1100 | - | - |
| Hexachloroethane | 67721 | 1.4 | 3.3 | - | - |
| Ideno(1,2,3-cd)pyrene | 193395 | 0.0038 | 0.018 | - | - |
| Iron[8] | 7439896 | 300 | - | 4,000 | 1,000 |
| Isophorone | 78591 | 35.0 | 960 | - | - |
| Lead | 7439921 | 15 | - | e(1.273 (ln Hard*)-1.460) | e(1.273 (ln Hard*)-4.705) |
| Lindane (gamma-BHC) | 58899 | 0.98 | 1.8 | 0.95 | |
| Malathion | 121755 | - | - | - | 0.1 |
| Mercury | 7439976 | 2.0 | 0.051 | 1.4 | 0.77 |
| Methylmercury | 22967926 | | 0.3 mg/Kg | | |
| Methoxychlor | 72435 | 100 | - | - | 0.03 |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Methylbromide | 74839 | 47 | 1,500 | - | - |
| Methylene Chloride | 75092 | 4.6 | 590 | - | - |
| Mirex | 2385855 | - | - | - | 0.001 |
| Nickel | 7440020 | 610 | 4,600 | e(0.8460 (ln Hard*)+ 2.255) | e(0.8460 (ln Hard*)+ 0.0584) |
| Nitrate (as N) | 14797558 | 10,000 | - | - | - |
| Nitrobenzene | 98953 | 17 | 690 | - | - |
| Nitrosamines, Other | N/A | 0.0008 | 1.24 | - | - |
| N-Nitrosodibutylamine | 924163 | 0.0063 | 0.22 | - | - |
| N-Nitrosodiethylamine | 55185 | 0.0008 | 1.24 | - | - |
| N-Nitrosodimethylamine | 62759 | 0.00069 | 3.0 | - | - |
| N-Nitrosodi-n-Propylamine | 621647 | 0.0050 | 0.51 | - | - |
| N-Nitrosodiphenylamine | 86306 | 3.3 | 6.0 | - | - |
| N-Nitrosopyrrolidine | 930552 | 0.016 | 34 | - | - |
| Nonylphenol | 1044051 | | | 28 | 6.6 |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Parathion | 56382 | - | - | 0.065 | 0.013 |
| Pentachlorobenzene | 608935 | 1.4 | 1.5 | - | - |
| Pentachlorophenol | 87865 | 0.27 | 3.0 | e(1.005 (pH)-4.869) | e(1.005 (pH)-5.134) |
| Phenol | 108952 | 21,000 | 860,000 [~~1,700,000~~] | - | - |
| Polychlorinated Biphenyls (PCBs) | N/A | 0.000064 | 0.000064 | - | 0.0014 |
| Pyrene | 129000 | 830 | 4,000 | - | - |
| Selenium | 7782492 | 170 | 4,200 | [~~20~~] | 5.0 |
| Silver | 7440224 | - | - | e(1.72 (ln Hard*)-6 .59) | - |
| Sulfate | N/A | 250,000 | - | - | - |
| Hydrogen Sulfide, Undissociated | 7783064 | - | - | - | 2.0 |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| Tetrachloroethylene | 127184 | 0.69 | 3.3 | - | - |
| Thallium | 7440280 | 0.24 | 0.47 | - | - |
| Toluene | 108883 | 1300 | 15,000 | - | - |
| Total Dissolved Solids | N/A | 250,000 | - | - | - |
| Toxaphene | 8001352 | 0.00028 | 0.00028 | 0.73 | 0.0002 |
| Tributyltin (TBT) | | | | 0.46 | 0.072 |
| Trichloroethylene | 79016 | 2.5 | 30 | - | - |
| Vinyl Chloride | 75014 | 0.025 | 2.4 | - | - |
| Zinc | 7440666 | 7,400 | 26,000 | e(0.8473 (ln Hard*)+ 0.884) | e(0.8473 (ln Hard*)+ 0.884) |
| 1,1-dichloroethylene | 75354 | 330 | 7100 | - | - |
| 1,1,1-trichloroethane | 71556 | 200 | - | - | - |
| 1,1,2-trichloroethane | 79005 | 0.59 | 16 | - | - |
| 1,1,2,2-tetrachloroethane | 79345 | 0.17 | 4.0 | - | - |
| 1,2-dichlorobenzene | 95501 | 420 | 1300 | - | - |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| 1,2-dichloroethane | 107062 | 0.38 | 37 | - | - |
| 1,2-dichloropropane | 78875 | 0.50 | 15 | - | - |
| 1,2-diphenylhydrazine | 122667 | 0.036 | 0.20 | - | - |
| 1,2-trans-dichloroethylene | 156605 | 140 | 10,000 | - | - |
| 1,2,4-trichlorobenzene | 120821 | 35 | 70 | - | - |
| 1,2,4,5-tetrachlorobenzene | 95943 | 0.97 | 1.1 | - | - |
| 1,3-dichlorobenzene | 541731 | 320 | 960 | - | - |
| 1,3-dichloropropene | 542756 | 0.34 | 21 | - | - |
| 1,4-dichlorobenzene | 106467 | 63 | 190 | - | - |
| 2-chloronaphthalene | 91587 | 1,000 | 1,600 | - | - |
| 2-chlorophenol | 95578 | 81 | 150 | - | - |
| 2-methyl-4,6-dinitrophenol | 534521 | 13 | 280 | - | - |
| 2,3,7,8-TCDD (Dioxin) | 1746016 | 5.0 E - 9 | 5.1 E - 9 | - | - |
| 2,4-D | 94757 | 100 | - | - | - |
| 2,4-dichlorophenol | 120832 | 77 | 290 | - | - |
| 2,4-dimethylphenol | 105679 | 380 | 850 | - | - |
| 2,4-dinitrophenol | 51285 | 69 | 5,300 | - | - |

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Pollutant | CAS[1] Number | Water Quality Criteria μg/L[2] | | | |
| | | Human Health: | | Warm Water Aquatic Habitat[3]: | |
| | | DWS[4] | Fish[5] | Acute[6] | Chronic[7] |
| 2,4-dinitrotoluene | 121142 | 0.11 | 3.4 | - | - |
| 2,4,5-TP (Silvex) | 93721 | 10 | - | - | - |
| 2,4,5-trichlorophenol | 95954 | 1,800 | 3,600 | - | - |
| 2,4,6-trichlorophenol | 88062 | 1.4 | 2.4 | - | - |
| 3,3'-dichlorobenzidine | 91941 | 0.021 | 0.028 | - | - |
| 4,4'-DDD | 72548 | 0.00031 | 0.00031 | - | - |
| 4,4'-DDE | 72559 | 0.00022 | 0.00022 | - | - |
| 4,4'-DDT | 50293 | 0.00022 | 0.00022 | 1.1 | 0.001 |

[1]CAS = Chemical Abstracts Service.

[2]Water quality criteria in μg/L unless reported in different units.

[3]Metal concentrations shall be total recoverable metals to be measured in an unfiltered sample, unless it can be demonstrated that a more appropriate analytical technique is available that provides a measurement of that portion of the metal present which causes toxicity to aquatic life.

[4]DWS = Domestic Water Supply Source.

[5]Fish = Fish Consumption.

[6]Acute criteria = protective of aquatic life based on one (1) hour exposure that does not exceed the criterion for a given pollutant.

[7]Chronic = protective of aquatic life based on ninety-six (96) hour exposure that does not exceed

the criterion of a given pollutant more than once every three (3) years on the average.

[8]The chronic criterion for iron shall not exceed three and five tenths (3.5) mg/L (thirty-five hundred μg/L) if aquatic life has not been shown to be adversely affected.

*Hard = Hardness as mg/L $CaCO_3$.

(2) The following additional criteria for radionuclides shall apply for Domestic Water Supply use:

(a) The gross total alpha particle activity, including radium-226 but excluding radon and uranium, shall not exceed fifteen (15) pCi/L;

(b) Combined radium-226 and radium-228 shall not exceed five (5) pCi/L. Specific determinations of radium-226 and radium-228 are not necessary if dissolved gross alpha particle activity does not exceed five (5) pCi/L;

(c) The concentration of total gross beta particle activity shall not exceed fifty (50) pCi/L;

(d) The concentration of tritium shall not exceed 20,000 pCi/l;

(e) The concentration of total Strontium-90 shall not exceed eight (8) pCi/L; or

(f) The concentration of uranium shall not exceed thirty (30) μg/l.

Section 7. Recreational Waters. (1) Primary contact recreation water. The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31:

(a) Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli. Fecal coliform criteria listed in

subsection (2)(a) of this section shall apply during the remainder of the year; and

(b) pH shall be between six and zero-tenths (6.0) to nine and zero-tenths (9.0) and shall not change more than one and zero-tenths (1.0) pH unit within this range over a period of twenty-four (24) hours.

(2) Secondary contact recreation water. The following criteria shall apply to waters designated for secondary contact recreation use during the entire year:

(a) Fecal coliform content shall not exceed 1,000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2,000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period; and

(b) pH shall be between six and zero-tenths (6.0) to nine and zero-tenths (9.0) and shall not change more than one and zero-tenths (1.0) pH unit within this range over a period of twenty-four (24) hours.

Section 8. Outstanding State Resource Waters. This designation category includes certain unique waters of the commonwealth.

(1) Water for inclusion.

(a) Automatic inclusion. The following surface waters shall automatically be included in this category:

1. Waters designated pursuant to[~~under~~] the Kentucky Wild Rivers Act, KRS 146.200-146.360;

2. Waters designated pursuant to[~~under~~] the Federal Wild and Scenic Rivers Act, 16 U.S.C. 1271-1287;

3.[~~Waters identified under the Kentucky Nature Preserves Act, KRS 146.410-146.530, which are contained within a formally dedicated nature preserve or are published in the registry of~~

~~natural areas in accordance with 400 KAR 2:080 and concurred upon by the cabinet; and~~

~~4.~~] Waters that support federally recognized endangered or threatened species pursuant to[~~under~~] the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531-1544.

(b) Permissible consideration. Other surface waters shall be considered for inclusion in this category if:

1. The surface waters flow through or are bounded by state or federal forest land, or are of exceptional aesthetic or ecological value or are within the boundaries of national, state, or local government parks, or are a part of a unique geological, natural, or historical area recognized by state or federal designation; or

2. The surface water is a component part of an undisturbed or relatively undisturbed watershed that can provide basic scientific data and possess outstanding water quality characteristics, or fulfill two (2) of the following criteria:

a. Support a diverse or unique native aquatic flora or fauna;

b. Possess physical or chemical characteristics that provide an unusual and uncommon aquatic habitat; or

c. Provide a unique aquatic environment within a physiographic region.

(2) Outstanding state resource waters protection. The designation of certain waters as outstanding state resource waters shall fairly and fully reflect those aspects of the waters for which the designation is proposed. The cabinet shall determine water quality criteria for these waters as follows:

(a) At a minimum, the criteria of Section 2 and Table 1 of Section 6 of this administrative regulation and the appropriate criteria associated with the stream use designation assignments in 401 KAR 10:026, shall be applicable to these waters.

(b) Outstanding state resource waters that are listed as Exceptional Waters in 401 KAR 10:030, Section 1(2) shall have dissolved oxygen maintained at a minimum concentration of six and zero-tenths (6.0) mg/L as a twenty-four (24) hour average and an instantaneous minimum concentration of not less than five and zero-tenths (5.0) mg/L.

(c)1. If the values identified for an outstanding state resource water are dependent upon or related to instream water quality, the cabinet shall review existing water quality criteria and determine if additional criteria or more stringent criteria are necessary for protection, and evaluate the need for the development of additional data upon which to base the determination.

2. Existing water quality and habitat shall be maintained and protected in those waters designated as outstanding state resource waters that support federally threatened and endangered species of aquatic organisms, unless it can be demonstrated that lowering of water quality or a habitat modification will not have a harmful effect on the threatened or endangered species that the water supports.

(d) Adoption of more protective criteria in accordance with this section shall be listed with the respective stream segment in 401 KAR 10:026.

(3) Determination of designation.

(a) A person may present a proposal to designate certain waters pursuant to[~~under~~] this section. Documentation requirements in support of an outstanding state resource water proposal shall contain those elements outlined in 401 KAR 10:026, Section 3(3)(a) through (h).

(b)1. The cabinet shall review the proposal and supporting documentation to determine if[~~whether~~] the proposed waters qualify as outstanding state resource waters within the criteria established by this administrative regulation.

2. The cabinet shall document the determination to deny or to propose redesignation, and a

copy of the decision shall be served upon the petitioner and other interested parties.

(c) After considering all of the pertinent data, a redesignation, if appropriate, shall be made pursuant to 401 KAR 10:026.

Section 9. Water Quality Criteria for the Main Stem of the Ohio River. (1) The following criteria apply to the main stem of the Ohio River from its juncture with the Big Sandy River at River Mile 317.1 to its confluence with the Mississippi River, and shall not be exceeded.

(2) These waters shall be subject to all applicable provisions of 401 KAR 10:001, 10:026, 10:029, 10:030, and this administrative regulation, except for those criteria in paragraphs (a) and (b) of this subsection.

(a) Dissolved oxygen. Instream concentrations shall average at least five and zero-tenths (5.0) mg/L per calendar day and shall not be less than four and zero-tenths (4.0) mg/L except during the April 15 - June 15 spawning season when a minimum of five and one-tenth (5.1) mg/L shall be maintained.

(b) Maximum allowable instream concentrations for nitrite-nitrogen for the protection of human health shall be one and zero-tenths (1.0) mg/L and shall be met at the edge of the assigned mixing zone.

Section 10. Exceptions to Criteria for Specific Surface Waters. (1) The cabinet may grant exceptions to the criteria contained in Sections 2, 4, 6, 7, 8, and 9 of this administrative regulation for specific surface water upon demonstration by an applicant that maintenance of applicable water quality criteria is not attainable or scientifically valid but the use designation is still appropriate.

(2) The analysis shall show that the water quality criteria cannot be reasonably achieved, either on a seasonal or year-round basis due to natural conditions or site-specific factors differing

from the conditions used to derive criteria in Sections 2, 4, 6, 7, 8, and 9 of this administrative regulation.

(a) Site-specific criteria shall be developed by the applicant utilizing toxicity tests, indicator organisms, and application factors that shall be consistent with those outlined in Chapter 3 of Water Quality Standards Handbook, EPA, 1994.

(b) In addition, an applicant shall supply the documentation listed in 401 KAR 10:026, Section 3.

(3) An exception to criteria listed in Table 1 of Section 6 of this administrative regulation for the protection of human health from the consumption of fish tissue may be granted if it is demonstrated that natural, ephemeral, intermittent, or low flow conditions or water levels preclude the year-round support of a fishery, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges.

(4) Before granting an exception to water quality criteria, the cabinet shall ensure that the water quality standards of downstream waters shall be attained and maintained.

(5) All exceptions to water quality criteria shall be subject to review at least every three (3) years.

(6) Exceptions to water quality criteria shall be adopted as an administrative regulation by listing them with the respective surface water in 401 KAR 10:026.

Section 11. Exceptions to Criteria for Individual Dischargers. (1) An exception to criteria may be granted to an individual discharger based on a demonstration by the discharger,[~~,~~] that KPDES permit compliance with existing instream criteria cannot be attained because of factors specified in 401 KAR 10:026, Section 2(4)(a) through (f).

(2) The demonstration shall include an assessment of alternative pollution control strategies

and biological assessments that indicated designated uses are being met.

(3) Before granting an exception, the cabinet shall ensure that the water quality standards of downstream waters shall be attained and maintained.

(4) All exceptions shall be submitted to the cabinet for review at least every three (3) years. Upon review, the discharger shall demonstrate to the cabinet the effort the discharger made to reduce the pollutants in the discharge to levels that would achieve existing applicable water quality criteria.

(5) The highest level of effluent quality that can be economically and technologically achieved shall be ensured while the exception is in effect.

(6) The Kentucky Pollution Discharge Elimination System permitting program shall be the mechanism for the review and public notification of intentions to grant exceptions to criteria.

Section 12. Incorporation by Reference. (1) The following material is incorporated by reference:

(a) "Water Quality Standards Handbook-Chapter 3", EPA August 1994, Publication EPA-823-B-94-005a, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.; and

(b) "Interim Economic Guidance for Water Quality Standards Workbook", EPA March 1995, Publication EPA-823-B-95-002, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Division of Water, 200 Fair Oaks Lane, Frankfort, Kentucky, Monday through Friday, 8 a.m. to 4:30 p.m.

401 KAR 10:031 “Surface water standards.” approved for promulgation:

| | |
|---|---|
| Date | Leonard K. Peters, Secretary<br>Energy and Environment Cabinet |

PUBLIC HEARING AND PUBLIC COMMENT PERIOD: A public hearing on this administrative regulation shall be held on September 27, 2012 at 5:00 P.M. (Eastern Time) at 300 Fair Oaks Lane, Conference Room 301D, Frankfort, Kentucky.

Individuals interested in being heard at this hearing shall notify this agency in writing by September 17, 2012, five workdays prior to the hearing, of their intent to attend. If no notification of intent to attend the hearing is received by that date, the hearing may be canceled.

This hearing is open to the public. Any person who wishes to be heard will be given an opportunity to comment on the proposed administrative regulation. A transcript of the public hearing will not be made unless a written request for a transcript is made. If you do not wish to be heard at the public hearing, you may submit written comments on the proposed administrative regulation. Written comments shall be accepted until October 1, 2012. Send written notification of intent to be heard at the public hearing or written comments on the proposed administrative regulation to the contact person.

CONTACT PERSON: Peter Goodmann
Division of Water
200 Fair Oaks Lane
Frankfort, KY 40601
Telephone: (502) 564-3410 Fax (502) 564-0111
Email: Peter.Goodmann@ky.gov

## REGULATORY IMPACT ANALYSIS AND TIERING STATEMENT

Administrative Regulation #: 401 KAR 10:031
Contact Person: Sandy Gruzesky, Director

**(1) Provide a brief summary of:**

**(a) What this administrative regulation does:** This administrative regulation establishes water quality standards for surface waters of the Commonwealth and the associated water quality criteria necessary to protect designated uses.

**(b) The necessity of this administrative regulation:** This administrative regulation is necessary for the protection of public health, aquatic habitat, and designated uses of the surface waters of the Commonwealth.

**(c) How this administrative regulation conforms to the content of the authorizing statutes:** This administrative regulation conforms to KRS 224.10-100, which requires the cabinet to develop and conduct a comprehensive program for the management of water resources and to provide for the prevention, abatement, and control of water pollution. This administrative regulation and 401 KAR 10:001, 10:026, 10:029, and 10:030 establish procedures to protect the surface waters of the Commonwealth, and thus manage water resources and prevent water pollution. This administrative regulation describes the criteria applied in 401 KAR 10:026 to the surface waters of the Commonwealth. This administrative regulation establishes water quality standards that consist of designated legitimate uses of the surface waters of the Commonwealth and the associated water quality criteria necessary to protect those uses.

**(d) How this administrative regulation currently assists or will assist in the effective administration of the statutes:** This administrative regulation will assist in the administration of the statutes by providing specific criteria and water quality standards for the protection of surface waters of the Commonwealth as required by the authorizing statutes.

**(2) If this is an amendment to an existing administrative regulation, provide a brief summary of:**

**(a) How the amendment will change this existing administrative regulation:** This amendment deletes a citation to an outdated Executive Order; clarifies the cabinet's nutrient criteria; updates water quality criteria, specifically acrolein and phenol, to reflect scientific developments; and eliminate the Warm Water Aquatic Habitat acute criterion for Selenium. EPA has previously expressed concern regarding the methodology used by EPA to develop this criterion, mainly that the criterion represents a projection from the chronic criterion and is not based on empirical data. The elimination of the acute selenium criterion recognizes that on June 2, 2000 in accordance with a ruling by the U. S. Court of Appeals, EPA withdrew the acute criterion for selenium it had promulgated for the Great Lakes basin. Until the EPA promulgates new criteria that accounts for the latest science and complexity of the causative selenium species that result in acute toxicity, the cabinet is proposing to withdraw that criterion. This amendment also deletes a criterion for automatic inclusion for a designation of Outstanding State Resource Water; and clarifies that dissolved oxygen is an instream criterion. Other minor amendments are proposed to comply with regulation drafting requirements.

**(b) The necessity of the amendment to this administrative regulation:** The amendment to water quality criteria is necessary to revise criteria to protect human health and to meet federal recommendations. For Kentucky to maintain its delegation over the NPDES permit program,

the Clean Water Act requires that Kentucky review its water quality standards every three years and comply with the programmatic requirements of 40 C.F.R. Part 131. This administrative regulation is being amended as part of the triennial review. The other amendments to the regulation simply clarify the cabinet's interpretation of this administrative regulation. Other minor amendments are proposed to comply with regulation drafting requirements.

**(c) How the amendment conforms to the content of the authorizing statutes:** This amendment conforms to KRS 224.10-100, which requires the cabinet to develop and conduct a comprehensive program for the management of water resources and to provide for the prevention, abatement, and control of water pollution. This amendment establishes procedures to protect the surface waters of the Commonwealth, and thus protect water resources. This amendment establishes water quality standards that consist of designated legitimate uses of the surface waters of the Commonwealth and the associated water quality criteria necessary to protect those uses.

**(d) How the amendment will assist in the effective administration of the statutes:** This amendment will assist in the administration of the statutes by providing clear and up-to-date criteria and water quality standards for the protection of surface waters of the Commonwealth in accordance with the authorizing statutes.

**(3) List the type and number of individuals, businesses, organizations, or state and local governments affected by this administrative regulation:** This administrative regulation applies to the surface waters of the Commonwealth. All individuals, businesses, organization, and governments that use the commonwealth's surface waters may be impacted by this regulation if they apply for a new or expanded discharge permit.

**(4) Provide an analysis of how the entities identified in question (3) will be impacted by either the implementation of this administrative regulation, if new, or by the change, if it is an amendment, including:**

**(a) List the actions that each of the regulated entities identified in question (3) will have to take to comply with this administrative regulation or amendment:** The revised water quality criteria will be implemented at the time of permit issuance at existing facilities and new dischargers and expanded facilities will comply with the revisions. Additional costs may be incurred where criteria are more stringent than before or where new criteria are established and less cost will be incurred where criteria have been lowered.

**(b) In complying with this administrative regulation or amendment, how much will it cost each of the entities identified in question (3):** The costs to comply with this administrative regulation will vary considerably depending on the site location, the type of activity occurring, and other factors. Therefore, it is not possible to determine quantitative costs to implement this regulation.

**(c) As a result of compliance, what benefits will accrue to the entities identified in question (3):** Less costs may be incurred where criteria are less stringent than previously. Direct and indirect savings will be realized through reduced drinking water treatment costs, maintenance of good agricultural water, maintenance of fisheries, and healthy recreational waters.

**(5) Provide an estimate of how much it will cost the administrative body to implement this administrative regulation:**

**(a) Initially:** There are no initial costs as a result of amending this administrative regulation

**(b) On a continuing basis:** There are no continuing costs as a result of amending this administrative regulation.

**(6) What is the source of the funding to be used for the implementation and enforcement of this administrative regulation?** The source of revenue will be the General Fund as appropriated by the Kentucky General Assembly and federal funds.

**(7) Provide an assessment of whether an increase in fees or funding will be necessary to implement this administrative regulation, if new, or by the change if it is an amendment:** No increase in fees or funding will be necessary to implement this administrative regulation.

**(8) State whether or not this administrative regulation established any fees or directly or indirectly increased any fees:** This administrative regulation does not establish or increase fees.

**(9) TIERING: Is tiering applied? (Explain why or why no**t)

Yes, tiering is applied in this administrative regulation. Water quality standards and associated criteria vary based on the designated use of the surface water.

**FISCAL NOTE ON STATE OR LOCAL GOVERNMENT**

**Regulation #:** 401 KAR 10:031 **Contact Person:** Sandy Gruzesky, Director

1. **What units, parts or divisions of state or local government (including cities, counties, fire departments, or school districts) will be impacted by this administrative regulation?** This administrative regulation will affect the wastewater treatment operations of local government if they will have new or expanded discharges into surface waters of the Commonwealth.

2. **Identify each state or federal statute or federal regulation that requires or authorizes the action taken by the administrative regulation.** KRS 146.220, 146.241, 146.270, 146.410, 146.450, 146.460, 146.465, 224.10-100, 224.16-050, 224.16-060, 224.70-100, 224.70-110, 40 C.F.R. Part 131, 16 U.S.C. 1271-1287, 1531-1544, 33 U.S.C. 1311, 1313, 1314, 1341

3. **Estimate the effect of this administrative regulation on the expenditures and revenues of a state or local government agency (including cities, counties, fire departments, or school districts) for the first full year the administrative regulation is to be in effect.**
   **(a) How much revenue will this administrative regulation generate for the state or local government (including cities, counties, fire departments, or school districts) for the first year?** This regulation will not generate any revenue
   **(b) How much revenue will this administrative regulation generate for the state or local government (including cities, counties, fire departments, or school districts) for subsequent years?** This regulation will not generate any revenue.
   **(c) How much will it cost to administer this program for the first year?** There will be no cost to state or local agencies to implement this regulation.
   **(d) How much will it cost to administer this program for subsequent years?** There will be no cost to state or local agencies to implement this regulation.

**Note: If specific dollar estimates cannot be determined, provide a brief narrative to explain the fiscal impact of the administrative regulation.**

**Revenues (+/-):**

**Expenditures (+/-):**

**Other Explanation:** Wastewater treatment costs may increase for those local governments that will have new or expanded discharges into exceptional waters and high quality waters. Local governments withdrawing drinking water from these waters may have lower treatment costs, because these waters should have lower pollutant loads.

## FEDERAL MANDATE ANALYSIS COMPARISON

Administrative Regulation#: 401 KAR 10:031
Contact Person: Sandy Gruzesky, Director

1. **Federal statute or regulation constituting the federal mandate.** There is no federal statute or regulation mandating that Kentucky implement a water pollution control program. For Kentucky to maintain its delegation over the NPDES permit program, the Clean Water Act requires that Kentucky review its water quality standards every three years and comply with the programmatic requirements of 40 C.F.R. Part 131, including the requirement for reviewing water quality criteria for appropriate revisions.

2. **State compliance standards.** KRS 146.220, 146.241, 146.270, 146.410, 146.450, 146.460, 146.465, 224.10-100, 224.16-050, 224.16-060, 224.70-100, 224.70-110

3. **Minimum or uniform standards contained in the federal mandate.** The Clean Water Act requires designated uses, criteria, standards and antidegradation policies in water quality standards. 40 C.F.R. Part 131, 16 U.S.C. 1271-1287, 1531-1544, 33 U.S.C. 1311, 1313, 1314, 1341

4. **Will this administrative regulation impose stricter requirements, or additional or different responsibilities or requirements than those required by the federal mandate?** No.

5. **Justification for the imposition of the stricter standard, or additional or different responsibilities or requirements.** There are no stricter standards or additional or different responsibilities or requirements.